5.4.10 WILDFIRE

This section provides a profile and vulnerability assessment for the wildfire hazard.

HAZARD PROFILE

This section provides profile information including description, location and extent, previous occurrences and losses and the probability of future occurrences.

Description

A wildfire is any instance of uncontrolled burning in grasslands, brush, or woodlands (NYSEMO, 2004). Wildfire is further defined as an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures (FEMA, 2004). Wildfires can be ignited by lightning and, most frequently, by human activity including smoking, campfires, equipment use, and arson.

There are three different classes of wildfires including surface fires, ground fires, and crown fires. Surface fires are the most common type and burn along the floor of a forest, through needles, leaves, grasses, fallen branches and low shrubs. Ground fires burn on or below the forest floor, smoldering through the decomposition layer (duff) and incorporated root systems, during periods of drought. Crown fires are those that burn primarily in the leaves and branches of trees, spreading from tree to tree above the ground (FEMA, 1993). On Long Island, wildfires are typically described as a "brush fire."

Wildfires pose a great threat to life and property, particularly when they move from forest or rangeland into developed areas. More than 140,000 wildfires burn an average of 5 million acres annually in the United States, causing millions of dollars in damage (FEMA, 2005). Since 1990, more than 900 homes have been destroyed each year as a result of wildfire and even a relatively small fire can cause substantial losses (NYSEMO, 2004). For example, the 1991 Oakland/Berkeley hills wildfire in California burned almost 3,000 homes on just 1,610 acres of land.

The potential for wildfire, and its subsequent development (growth) and severity is determined by several factors including the presence of fuel, the area's topography, and air mass. These factors are described below:

Fuel

Various fuels characteristics impact wildfire behavior and intensity, including: the type of fuel (vegetation or a structure), its "burning qualities" (chemical and physical properties), the horizontal continuity of the fuel, its vertical arrangement and its moisture level influence wildfire behavior and intensity (FEMA, 2004). Grasses burn quickly when compared to Pitch Pine, Scrub Oak and Ericaceous shrubs which are extremely volatile fuels (Kurtz, 2006). Grassland, shrubland, and forest fires all have the potential to injure firefighters and destroy valuable infrastructure including homes and businesses.

Fuel may include living and dead vegetation on the ground, growing on the surface as brush and small trees, and aerial fuel (for example, tree canopies). Man-made structures are also potential fuel sources for wildfire. Aggressive fire suppression

and forest management practices over the past century have allowed fuel to accumulate, which can increase the risk of a wildfire.

The vegetative patterns on Long Island are a result of two main processes, fire and substrate/soil composition (Brookhaven National Laboratory, 2003). When colonists arrived on Long Island three to four hundred years ago, the vegetative patterns were dominated by pitch pine scrub oak woodlands and warm season grasslands. Bordering the Hempstead Plains in central Nassau County (unique grassland dominated by switch grass and bluestem) was the Oak Brush Plains of western Suffolk County. This area was dominated by shrubby growth of scrub oak mixed with other oak species and pitch pine. The next major vegetative group extending eastward through the remainder of Suffolk County was a mix of pitch pine, pine-oak, and oak-pine forests as well as pitch pine scrub oak shrublands and woodlands. In the central portion of this area (in the areas now designated as Eastport and Westhampton) were the dwarf pine plains, an area where very sandy soils coupled with frequent crown fires produced a globally-rare, stunted pitch pine scrub oak ecosystem. On the south shore's coastal plain, Pine Barrens vegetation also were present. Only on the north shore of Long Island included hardwood trees of any notable size. Except for the Hempstead Plains, which have been largely replaced by development, most of the original Long Island vegetative patterns still exist to varying degrees. A large portion of the native habitat in the eastern half of the Suffolk County is protected within the Central Pine Barrens (Brookhaven National Laboratory, 2003).

Area Topography

Topography can impact the wildfire hazard both in terms of the slope (upward or downward incline or slant of the land) and the elevation of land. The slope and terrain affect the movement of air and fire; the greater the slope, the more quickly a fire can travel (FEMA, 2004; NYSEMO, 2004). Hot gases rise in front of fire along a slope face, pushing fire up to four times faster than on level ground.

Most of the current topographic features of Long Island, were created in the Wisconsin glacial stage. Glacial ice sheets moved south to Long Island and stopped in the middle section of the island. Glacier ice sheets deposited rock and soil, creating the glacier formed ridge of land known as the Ronkonkoma Moraine. This ridge runs from Queens County through central Suffolk County and easterly past Montauk Point into the Atlantic Ocean. A second glacier terminated from Queens to Orient Point along the northern edge of Long Island creating the Harbor Hill Moraine. As each glacier melted, streams were created and carried tremendous volumes of sand and gravel in a generally southern direction. This material deposited to create the gently sloping sandy and well drained outwash plains to the south of each of the two moraines (NYS-DEC Peconic Headwaters Unit Management Plan).

In the study area, elevations range from a low of mean sea level (msl) along the coast to a high of 295 feet above msl (amsl) at Bald Hill. Slopes in the Central Pine Barrens are generally even to gently rolling, ranging from 0 to 30 percent. Sand and soil deposit patterns greatly influence the type of vegetation growing and the associated fire return interval. Sandy, nutrient-poor, well-drained soils tend to have a higher percentage of fire adapted vegetation that is adapted to fire, including more frequent localized droughts and fire return intervals.

Air Mass

The air mass can impact wildfire through climate (including, temperature, relative humidity), local wind speed and direction, cloud cover, precipitation amount and duration, and the stability of the atmosphere at the time of the fire. For example, significant local winds at the time of a wildfire can cause a wildfire to spread rapidly.

The climate of Long Island is mild; it is largely influenced by the Atlantic Ocean. The local climate is categorized as humid continental, meaning it is dominated by continental influences related to the proximity of the ocean (Brookhaven National Laboratory, 2004). The average annual relative humidity over the past 8 years is 75% in the morning and 56% in the afternoon (NRCC, Cornell, 2006). Average temperatures are warmest in July and August and coldest in January and February. The average summer temperature in Suffolk County is 71.9ºF. Temperature extremes in the summer are generally tempered by cooling ocean breezes. The average winter temperature is 32.4ºF. Average annual rainfall totals are reported to be 45 inches for some areas in the Central Pines Barrens; however, there have been several times in the past half century when annual rainfall has been 10 inches less than normal.

Local winds, which are a part of the air mass factor, can come from all directions in the study area; when under a stable high pressure air mass, with light winds, a sea breeze often develops shifting winds to the south and southwest while slightly increasing humidity. The unpredictability and uncertainty of wind directions and speeds makes fire prediction and suppression more challenging. Wind speeds greater than 10 miles per hour can cause wildfires to spread rapidly and can increase the flame heights that occur (Central Pine Barren Wildfire Task Force, 1999). Large crown fires on Long Island are typically associated with wind events and tend to make their large runs for only a few operational periods (days).

Wildfires typically occur on Long Island during two main seasons. Most wildfires occur in the spring, from early March through early July; fires during this period typically burn fuels on the forest floor and understory. During the second fire season, which lasts from late summer through early autumn, fires are not as frequent but have the capacity to become larger and burn the crowns of the forest canopy. According to the NYS Plan, NY is most vulnerable to wildfire hazard events from "the end of the snow pack until leaf out and the end of August". However, a growing number of fire district managers across the United States have noted that because of persistent drought conditions, increasingly hot and dry weather, and changing weather patterns across the country, the fire season is now approaching a year-round threat.

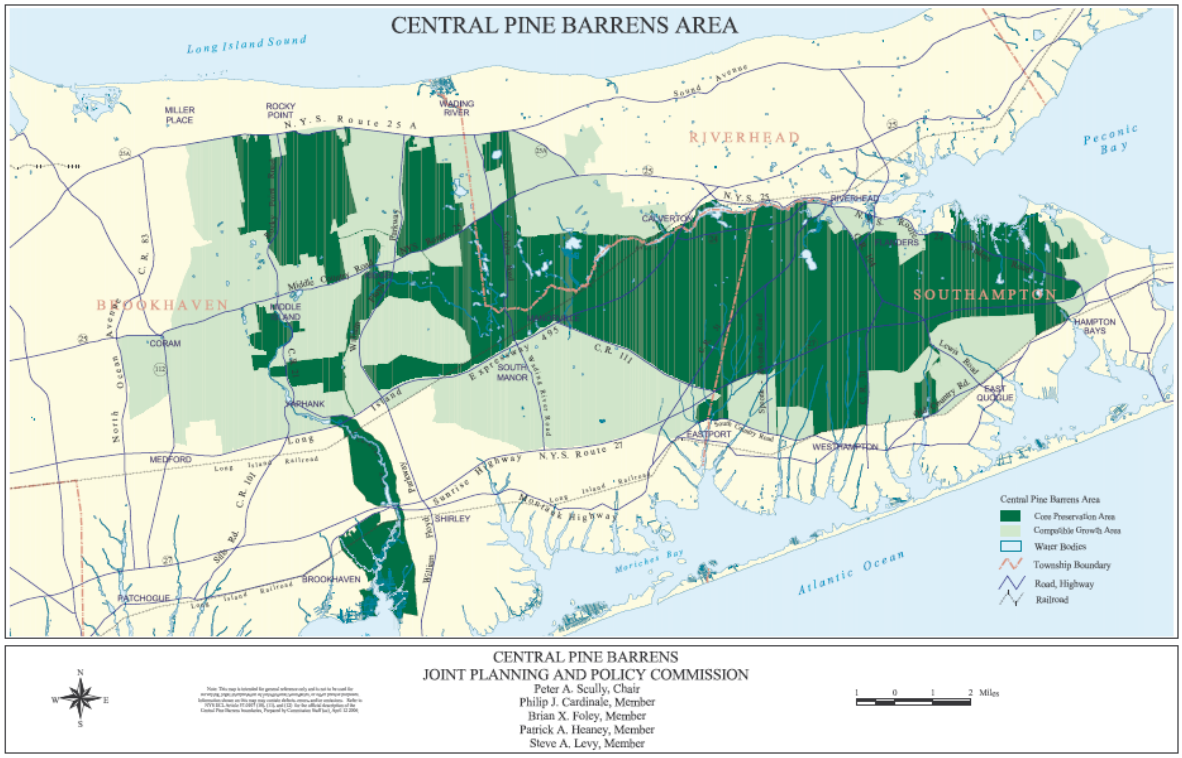
Location and Extent

The NYS Plan identifies the Mitigation Planning Area Number 1, which includes Suffolk County, as an area with a special risk for wildfire. It may be assumed that any open land areas are susceptible to wildfire; however, the risk to life and property is greatest where forested areas adjoin urbanized areas (high density residential, commercial, and industrial); these areas are known as the wildland/urban interface (WUI) zone. As a result of the tremendous growth in residential, commercial, and industrial occupancies throughout Suffolk County, and a shift from urban to suburban development, there has been increasing development in previously undeveloped areas, including encroachment on the WUI, and a corresponding increase in the risks posed to people and property.

Central Pine Barrens Ecology and Wildfire Profile

The Central Pine Barrens on Long Island is a forested area of approximately 102,500 acres within the central and eastern portions of Suffolk County; this area has an extensive history and ongoing risk of frequent wildfire. Figure 5-188 shows a detailed map of the Central Pine Barrens, which include parts of the Towns of Brookhaven, Riverhead, and Southampton and is legally divided into a 55,000 acre Core Preservation Area and a 47,500 acre Compatible Growth Area (Central Pine Barren Wildfire Task Force, 1999). Pre-fire planning and wildfire suppression in the area are coordinated by the Central Pine Barrens Wildfire Task Force, which maintains a Fire Management Plan (finalized in 1999) that provides a comprehensive evaluation of the issues associated with wildfire in the Central Pine Barrens. The Fire Management Plan is currently under revision.

Figure 5-188. Central Pine Barrens Area Detail



Source: Central Pine Barrens Wildfire Task Force, 1999.

At the center of the Central Pine Barrens is a mosaic of forests, coastal plain ponds, marshes, and streams. The three forest types, pitch pine-tree oak (covering approximately 35 percent), tree oak-pitch pine (55%), and pitch pine-scrub oak-heath woodlands and shrublands (7%), are predominantly fire dependent (meaning that many of the species have adapted to and depend on periodic fire for long-term survival) (Kurtz, 2007). Pine Barrens are found on quick-draining soils with low nutrient content and high acidity. To help retain moisture, many of the plant species produce waxes and resins, which also are flammable (Brookhaven National Laboratory, 2004). During periods of above average temperatures and below average rainfall and humidity, high resin content (which increases ignition potential, flammability, and fire intensity) and rapid drying rates, can result in extreme fire dangers. Pitch pines are able to survive most fires due to their thick, insulating bark and ability to rapidly sprout from buds in the trunk and root collar.

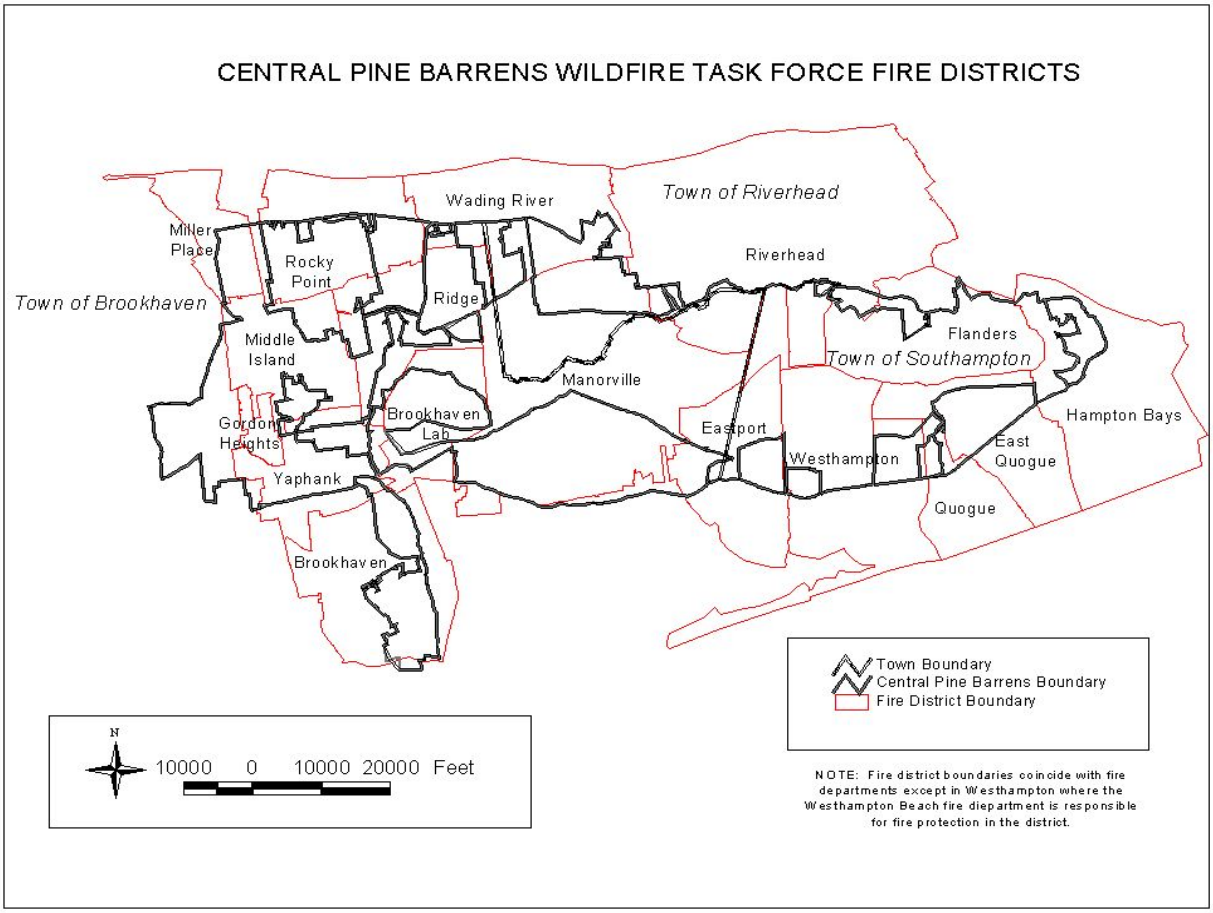
The Central Pine Barrens contains one of the greatest concentrations of endangered, threatened, and special concern plant and animals species in NY and provides recharge to the aquifer from which Long Island draws significant portions of its drinking water. There are approximately 1,000 annual wildfires in the Central Pine Barrens; as many as 75 brush fires may occur on a spring day. Over 95 percent of these fires are estimated to be anthropogenic (started by humans), including both accidental fires and arson. On the east coast of the United States, wildfires ignited by lightning are less frequent than in the west because lightening in the east is generally accompanied by rainstorms.

Figure 5-189 on the following page shows the boundaries of those fire districts serving the Central Pines Barrens. The 17 fire districts whose jurisdiction includes some portion of the Core Preservation Area of the Central Pine Barrens (as defined by the State) include:

- Brookhaven Fire District
- East Quogue Fire District
- Eastport Fire District
- Flanders Fire District
- Gordon Heights Fire District
- Hampton Bays Fire District
- Manorville Fire District
- Middle Island Fire District
- Miller Place Fire District
- Quogue Fire District
- Ridge Fire District
- Riverhead Fire District
- Rocky Point Fire District
- Wading River Fire District
- Westhampton Beach Fire District
- Westhampton Fire Protection District
- Yaphank Fire District

Source: Central Pine Barrens Wildfire Task Force, 1999.

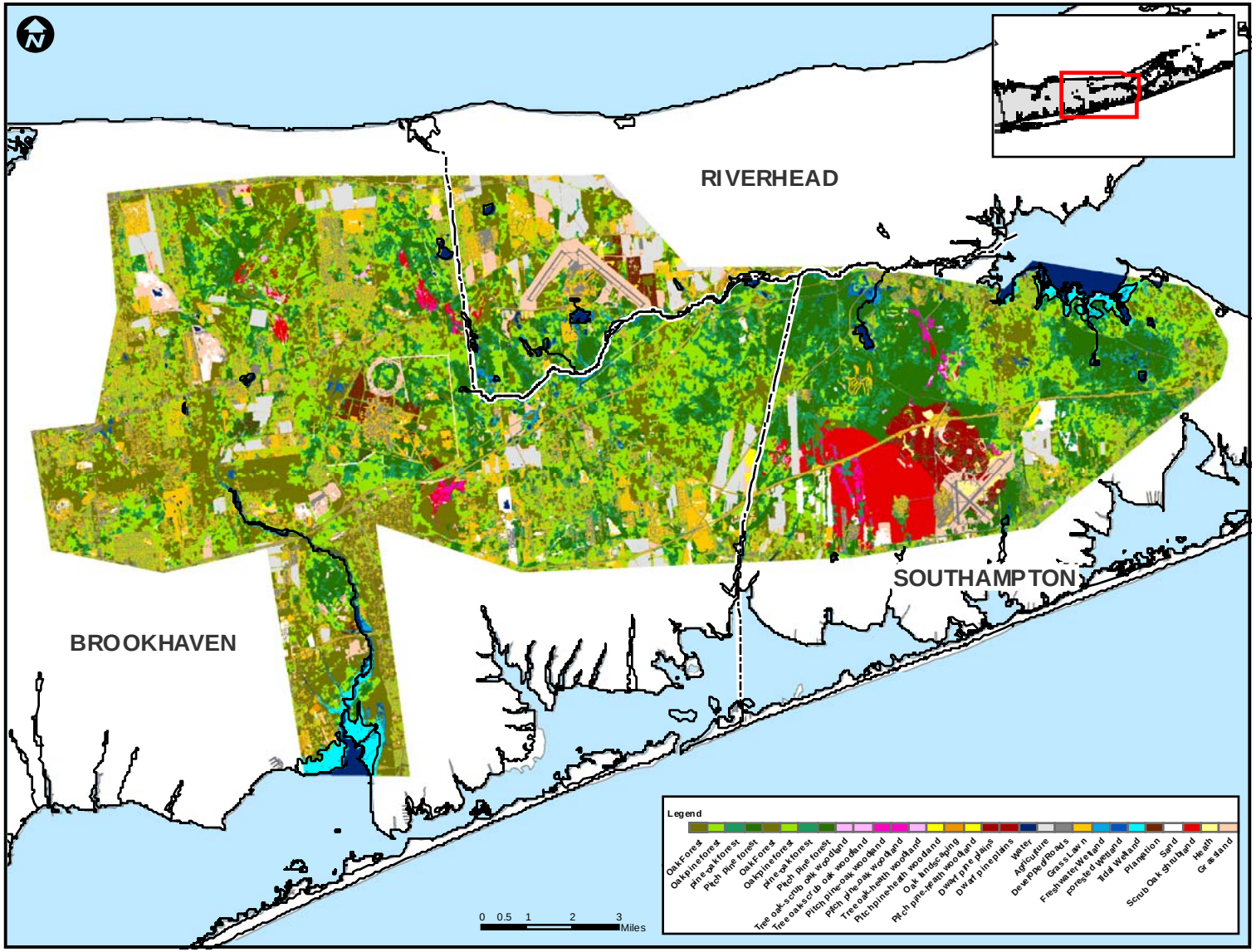
Figure 5-189. Central Pine Barrens Fire District Boundaries



Source: Central Pine Barrens Wildfire Task Force, 1999

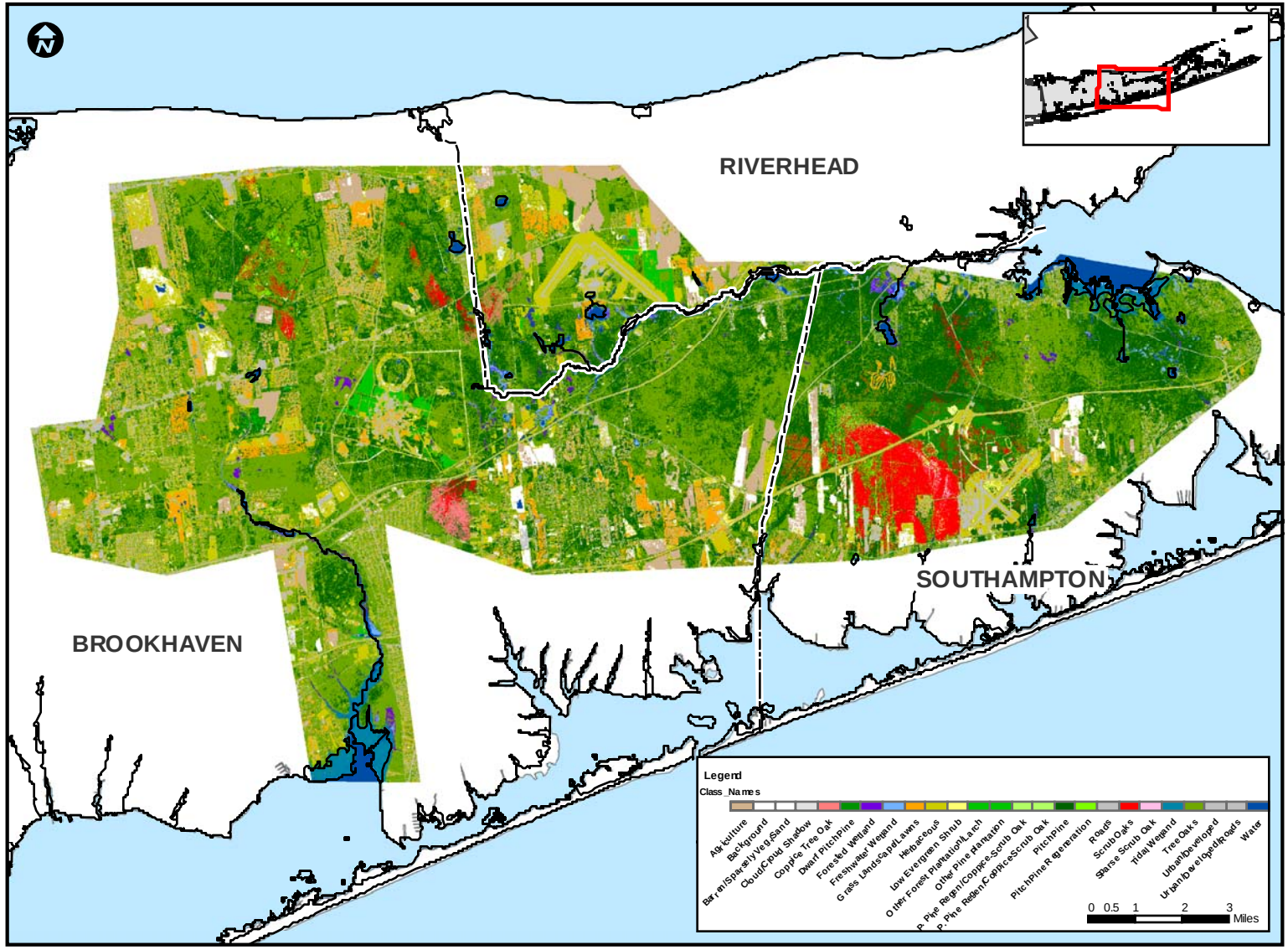
Figures 5-190 and 5-191 illustrate Pine Barren vegetative communities and cover types for the Central Pine Barrens area in relation to towns and villages participating in the Suffolk County hazard mitigation planning process. These figures illustrate specific areas in the Central Pine Barrens that have a higher relative risk based on vegetation type (including factors such as resin content, ability to retain moisture, and proximity to occupied structures).

Figure 5-190. Central Pine Barrens Vegetative Communities



Source: Long Island Chapter of the Nature Conservancy

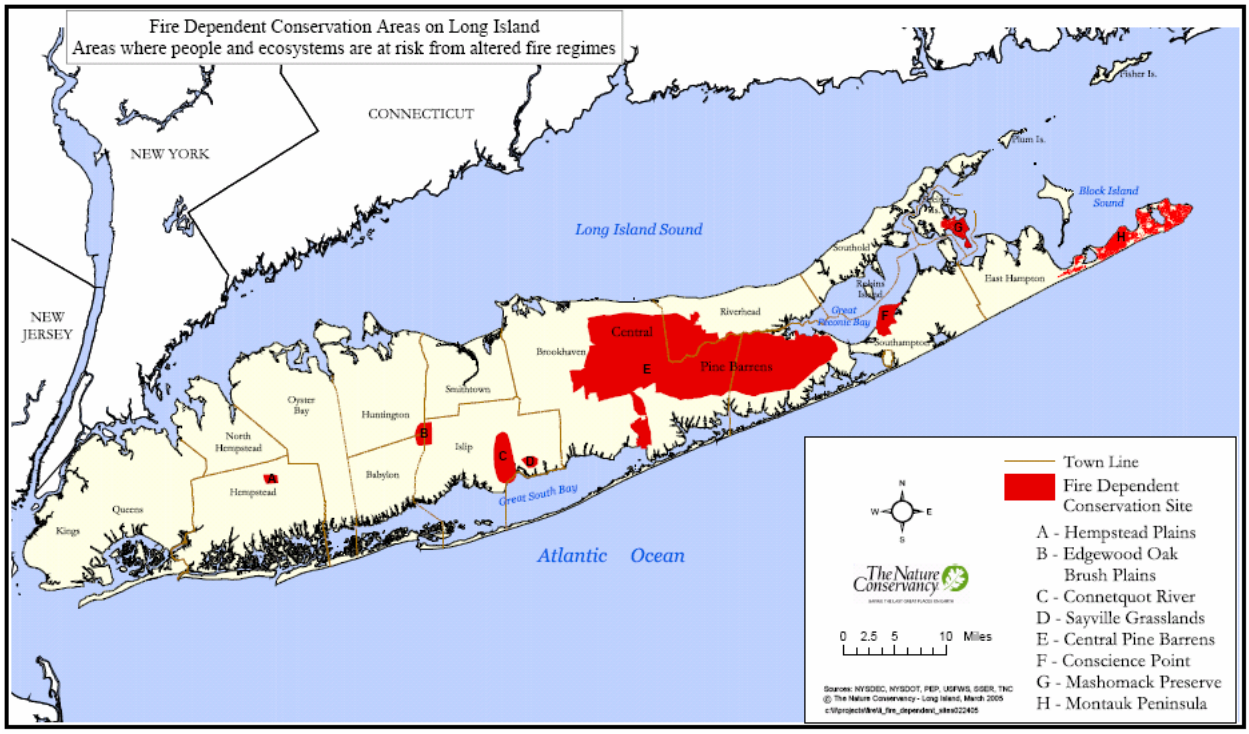
Figure 5-191. Central Pine Barrens Land Cover Types



Source: Long Island Chapter of the Nature Conservancy

In addition to the Central Pine Barrens, there are several other wildfire hazard areas identified as "at risk" to the wildfire hazard by The Nature Conservancy. These areas include Edgewood Oak Brush Plains, Connetquot River, Sayville Grasslands, Conscience Point, Mashomack Preserve and Montauk Peninsula (Figure 5-192).

Figure 5-192. Fire Dependent Conservation Areas on Long Island



Source: The Nature Conservancy

Wildfire Assessment Tools

There are several tools available to estimate fire potential, danger and growth including the United States Department of Agriculture (USDA) Forest Service's Wildland Fire Assessment System (WFAS), and the Haine's Index.

Wildland Fire Assessment System (WFAS)

The WFAS is an internet-based information system that provides a national view of weather and fire potential, including national fires danger, weather maps and satellite-derived "Greenness" maps (Burgan et. al., 1997).

The USDA Forest Service created the WFAS Fire Danger Rating level system that compiles and evaluates data including current and antecedent weather, fuel types, and moisture content (for both live and dead fuel). The WFAS Fire Danger Rating is a descriptive coding system that allows fire managers from across the country to evaluate and describe the fire danger in their area (Table 5-57).

Table 5-57. Wildland Fire Assessment System Fire Danger Rating and Color Code System

Fire Danger Rating and Color Code	Description
Low (L) (Dark Green)	Fuels do not ignite readily from small firebrands although a more intense heat source, such as lightning, may start fires in duff or punky wood. Fires in open cured grasslands may burn freely a few hours after rain, but woods fires spread slowly by creeping or smoldering, and burn in irregular fingers. There is little danger of spotting.
Moderate (M) (Light Green or Blue)	Fires can start from most accidental causes, but with the exception of lightning fires in some areas, the number of starts is generally low. Fires in open cured grasslands will burn briskly and spread rapidly on windy days. Timber fires spread slowly to moderately fast. The average fire is of moderate intensity, although heavy concentrations of fuel, especially draped fuel, may burn hot. Short-distance spotting may occur, but is not persistent. Fires are not likely to become serious and control is relatively easy.
High (H) (Yellow)	All fine dead fuels ignite readily and fires start easily from most causes. Unattended brush and campfires are likely to escape. Fires spread rapidly and short-distance spotting is common. High-intensity burning may develop on slopes or in concentrations of fine fuels. Fires may become serious and their control difficult unless they are attacked successfully while small.
Very High (VH) (Orange)	Fires start easily from all causes and, immediately after ignition, spread rapidly and increase quickly in intensity. Spot fires are a constant danger. Fires burning in light fuels may quickly develop high intensity characteristics such as long-distance spotting and fire whirlwinds when they burn into heavier fuels.
Extreme (E) (Red)	Fires start quickly, spread furiously, and burn intensely. All fires are potentially serious. Development into high intensity burning will usually be faster and occur from smaller fires than in the very high fire danger class. Direct attack is rarely possible and may be dangerous except immediately after ignition. Fires that develop headway in heavy slash or in conifer stands may be unmanageable while the extreme burning condition lasts. Under these conditions the only effective and safe control action is on the flanks until the weather changes or the fuel supply lessens.

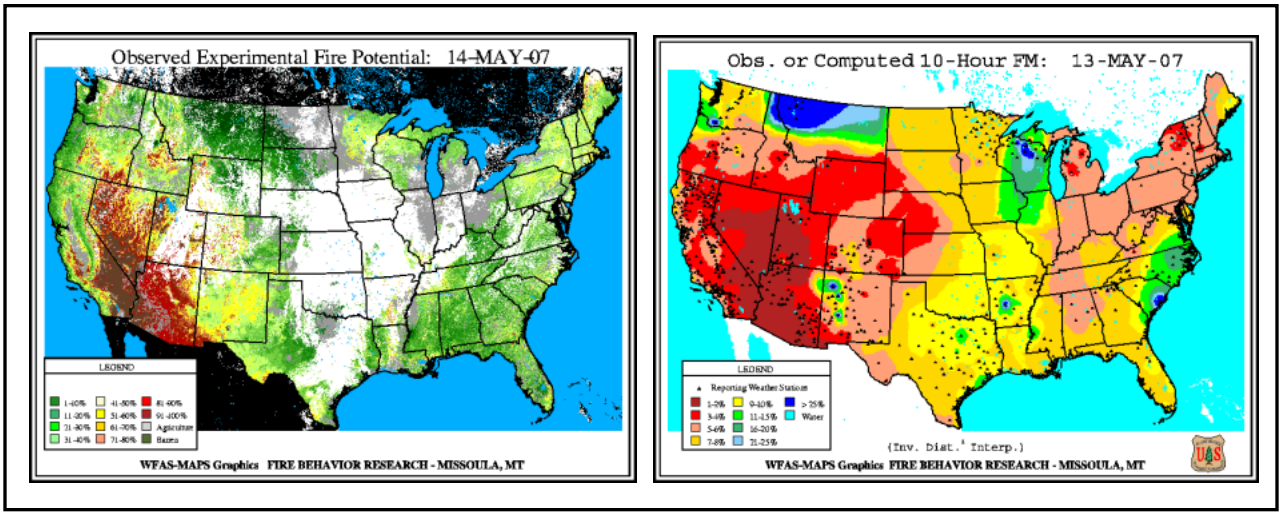
Source: (Wildland Fire Assessment System, 2007)

The WFAS provides the Observed Experimental Fire Potential map daily on their website. The experimental fire potential index map uses satellite derived relative greenness, a National Fire Danger Rating (NFDR) fuel model map (both 1 km resolution), and an interpolated 10-hour timelag map as inputs to weight the relative influence of live and dead vegetation to fire potential. The scale ranges from 0 (low) to 100 (high). Except for 10-hour moisture content, the calculations used in the NFDR System are not part of the Fire Potential Index.

The U.S. Fish and Wildlife Service operates an automated weather station on the south shore of Long Island and monitors NFDR data. The Central Pine Barrens Commission operates an automated fire weather station in Eastport. Based on data taken from this site, the Commission sends notifications during the work week of the daily fire danger weather rating to all fire departments and fire management personnel. Until recently, the 2pm data, including Keetch-Byram Drought Index (KBDI), included in these afternoon reports. Alerts are issued during periods of "high" or "extreme" fire conditions.

Figure 5-193 shows an example of an Observed Experimental Fire Potential Map and 10-Hour Fuel Moisture Map developed by the WFAS. Ten-hour fuel moisture of less than 7 percent is considered very dry, presenting a potential for high fire intensity which could result in crown fires.

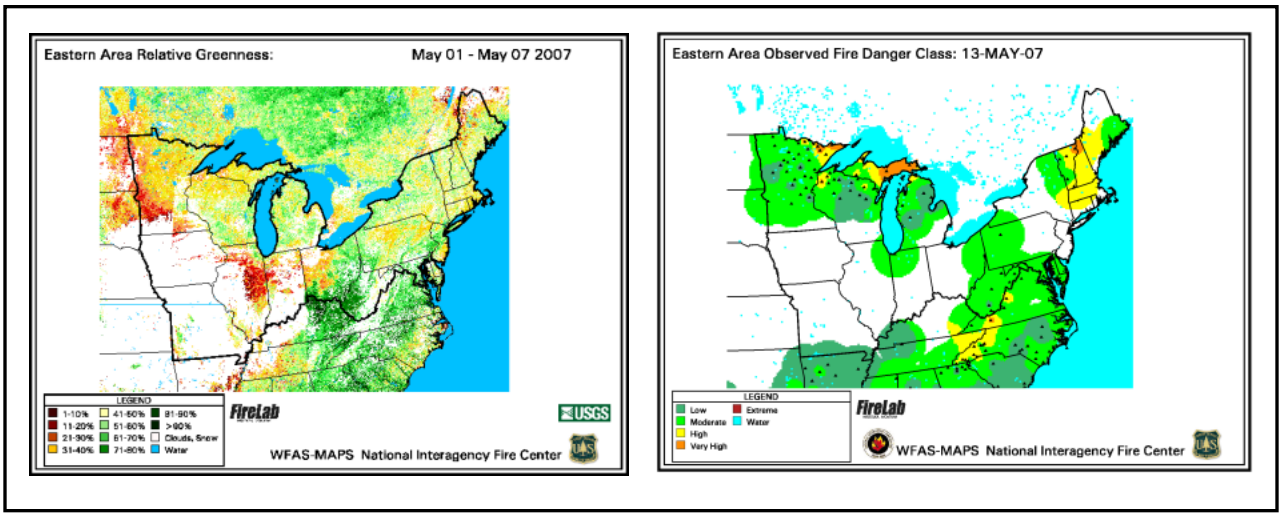
Figure 5-193. Observed Experimental Fire Potential and 10-hour Fuel Moisture Fire Danger Maps for the United States



Source: (Wildland Fire Assessment System, 2007)

Figure 5-194 shows an example of the Relative Greenness and Observed Fire Danger Class maps provided by WFAS for the northeastern United States.

Figure 5-194. Area Relative Greenness and Observed Fire Danger Class Maps for the Northeastern United States



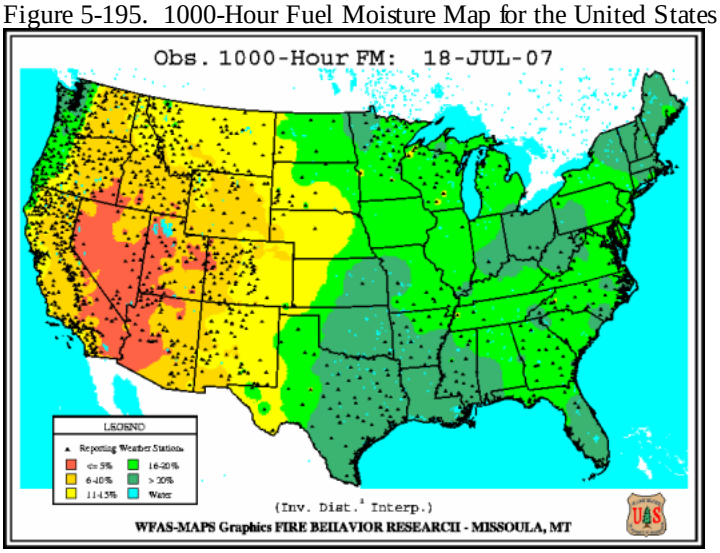
Source: (Wildland Forest Assessment System, 2007)

1000HR Fuels

The 1000-Hour Fuel Moisture (1000-hr FM) value is another tool to help determine fire potential. According to the Wildland Fire Assessment System website, "dead fuel moisture responds solely to ambient environmental conditions and is critical in determining fire potential." The 1000-hr FM represents the modeled moisture content in dead fuels in the 3 to 8 inch diameter class and the layer of the forest floor about four inches below the surface. The 1000-hr FM value is based on a running 7-day computed average using length of day, daily temperature and relative humidity extremes (maximum and

minimum values) and the 24-hour precipitation duration values (Northern Rockies Coordination Center, Date Unknown). Figure 5-195 illustrations the 1000-hr FM values for the US on July 18, 2007.

Figure 5-195. 1000-Hour Fuel Moisture Map for the United States



Source: (Wildland Fire Assessment System, 2007)

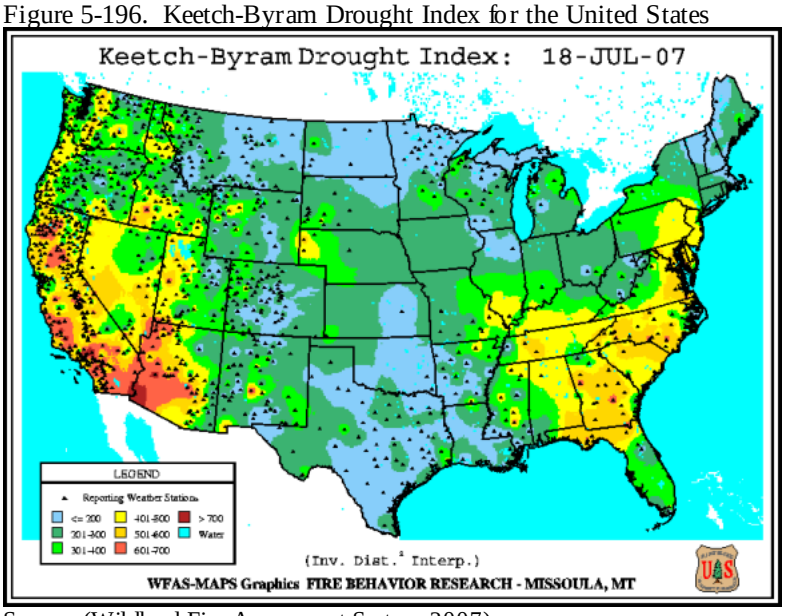
KBDI

The Keetch-Byram Drought Index (KBDI) is a drought index designed for fire potential assessment. According to the Wildland Fire Assessment System website, the KBDI "…value represents the net effect of evapotranspiration and precipitation in producing cumulative moisture deficiency in deep duff and upper soil layers. It is a continuous index, relating to the flammability of organic material in the ground.

The KBDI attempts to measure the amount of precipitation necessary to return the soil to full field capacity. It is a closed system ranging from 0 to 800 units and represents a moisture regime from 0 to 8 inches of water through the soil layer. At 8 inches of water, the KBDI assumes saturation. Zero is the point of no moisture deficiency and 800 is the maximum drought that is possible. At any point along the scale, the index number indicates the amount of net rainfall that is required to reduce the index to zero, or saturation.

The inputs for KBDI are weather station latitude, mean annual precipitation, maximum dry bulb temperature, and the last 24 hours of rainfall. Reduction in drought occurs only when rainfall exceeds 0.20 inch (called net rainfall)" (Wildland Fire Assessment System, 2007). Figure 5-196 illustrates the KBDI for the U.S. on July 18, 2007.

Figure 5-196. Keetch-Byram Drought Index for the United States



Source: (Wildland Fire Assessment System, 2007)

Haines Index

The Haines Index, also known as the Lower Atmosphere Stability Index, is used to indicate the potential for wildfire growth by measuring the stability and dryness of the air over a fire (Wildland Fire Assessment System, 2007). It is calculated by combining the stability and moisture content of the lower atmosphere into a number that correlates well with large fire growth. This index has been shown to be correlated with large fire growth on initiating and existing fires where surface winds do not dominate fire behavior. The Haines Index can range between 2 and 6. The drier and more unstable the lower atmosphere is, the higher the Haines Index rating.

Suffolk County Fire Weather Danger Rating

Data on fire weather, an important tool for both the prevention and suppression tactics for wildfires, is available to the local fire departments through Suffolk County Fire Rescue's Communication Center. A qualitative daily fire weather danger rating for Suffolk County is currently calculated by an interagency committee, based upon two fire weather stations, one operated by the US FWS at the Wertheim National Wildlife Refuge and one operated by the Central Pine Barrens Commission in Eastport.

The daily Suffolk County fire weather danger rating is given as one of four values:

- **"Low",** color coded as **Green,**
- **"Moderate",** color coded as **Blue,**
- **"High",** color coded as **Yellow,** or
- **"Extreme",** color coded as **Red.**

The daily fire weather danger rating indicates how fire will behave in the Central Pine Barrens areas; it does not predict the possibility of fire occurring. This fire weather index is currently utilized to notify the public when fire behavior potential reaches levels of concern that require special caution in the outdoors. This data is also used by the Federal, State and County Park officials in coordination with local officials when making decisions about restricting or prohibiting use of fire and other activities at parks and other public lands in the interest of public safety.

A CD-based GIS mapping tool, called "Fire Atlas" developed by the Long Island Chapter of The Nature Conservancy (TNC) is available to members of the Pine Barrens Commission, emergency responders, land managers, and local and state officials. This free tool consolidates valuable data for responders and decision-makers to support fire prevention, response planning, and emergency response. Data within the Fire Atlas includes hydrant locations, roads, access points, political boundaries, airports, vegetation species and covertypes, fuels, water sources, wetlands, and soil types.

Previous Occurrences and Losses

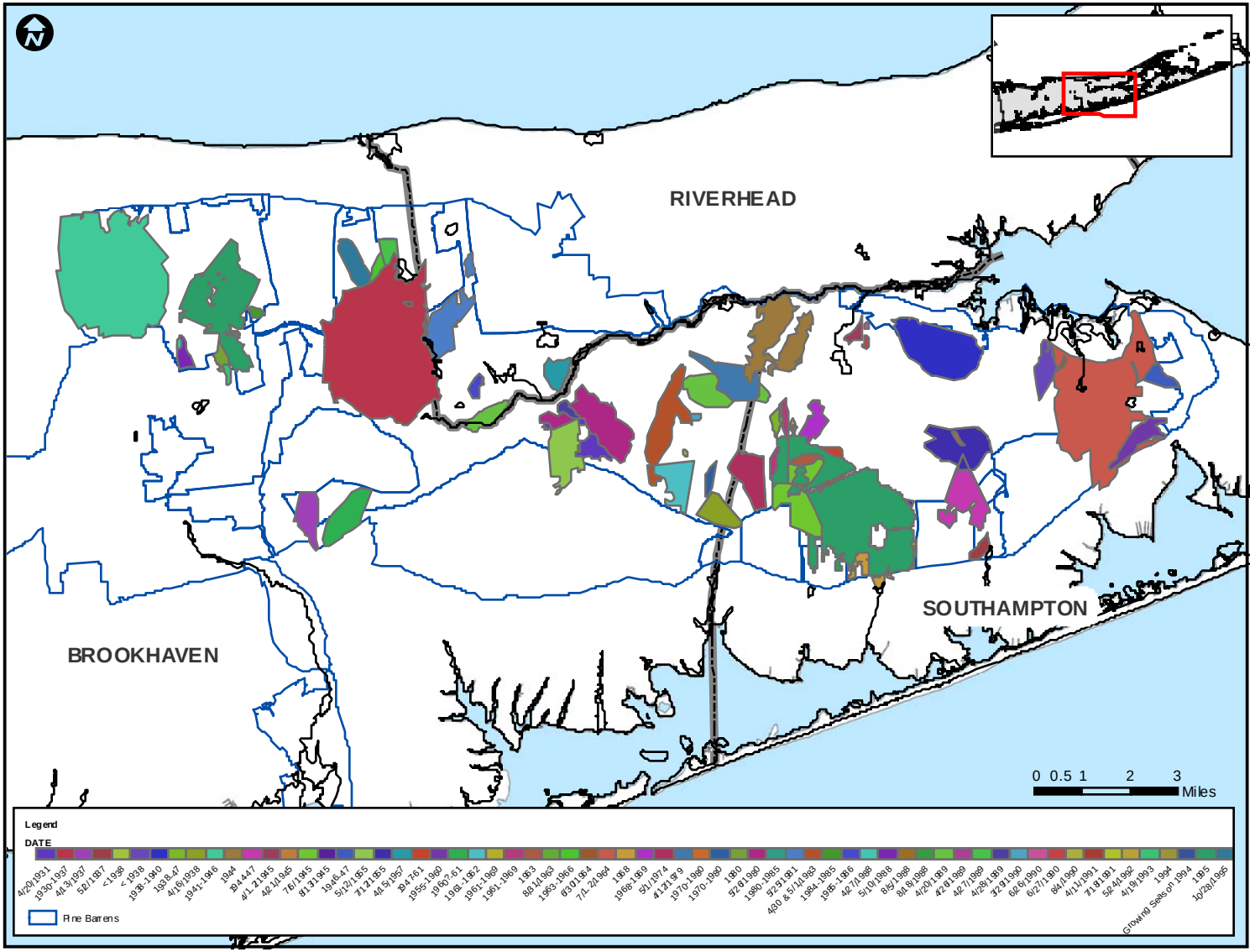
Impacts to human health and safety and property from major urban fires are often severe and direct. Fires have significant community-wide impacts, especially when lives and homes are impacted. Fires can also have significant economic impacts, especially if major transportation routes are closed.

The short-term effects of wildfires can include destruction of timber, forest, wildlife habitats, scenic vistas, and watersheds. Business and transportation disruption also can occur in the short term. Long-term effects can include reduced access to recreational areas; destruction of community infrastructure; and cultural and economic resources (USGS, 2006).

Several sources of historic wildfire statistics for NY and Suffolk County indicate that the previous occurrences and losses make the wild fire hazard a notable hazard of concern. The National Interagency Fire Center (NIFC) reports that in 2006, 249 wildfires burned a total of 2,508 acres across the State. The University of South Carolina's Spatial Hazard Events and Losses Database for the U.S. (SHELDUS) reports four significant wildfire disasters in Suffolk County from 1960 to the present, including fires in April 1962, August 1980, August 1995, and May 2001. None of these four fires resulted in human fatalities (SHELDUS, 2007).

Additional research through agencies and stakeholders including local fire agencies, state resources, and the Long Island Chapter of The Nature Conservancy (TNC) provides a more complete picture of historic wildfires in Suffolk County. Figure 5-197 illustrates some of the locations of well-documented historic wildfires on Long Island and concentrated in the Central Pine Barrens area. Table 5-58 provides a summary of significant wildfire events across the County as collected from multiple sources. Loss data for these wildfires are reported in the general information description, as available.

Figure 5-197. Location of Significant Historic Wildfires in Suffolk County



Source: Long Island Chapter of the Nature Conservancy

Table 5-58. Summary of Significant Wildfire Events Reported for Suffolk County, 1800 to 2007

Event Location	Date of Main Event(s)	Data Source	General Description
Central Islip	1839	Central Pine Barren Fire Management Plan, 1999	Two great fires in the Central Islip – Farmingdale area (Tredwell 1912).
Suffolk County (not specified)	1845	Central Pine Barren Fire Management Plan, 1999	A year after the main line of the railroad was completed. "...the extensive and awfully destructive fires, which, in the past season ... have swept over immense tracts of land ... In several places, the entire forest for 8 or 10 miles in length, and from 2 to 4 miles in breadth, have been completely swept over by the devouring element, which besides destroying every vestige of vegetation, consumed thousands of cords of wood that had been cut and piled..." (Prime 1845).
Suffolk County (not specified)	1848	Central Pine Barren Fire Management Plan, 1999	Peck described the central Suffolk railroad right-of-way as being "as dark and black as the ace of spades, as a most destructive fire had run over it in the month of August 1848; had burned for two weeks and burned over about 75 square miles." (Bayles 1873).
Smithtown, Brookhaven, Riverhead, Southampton	1862	Central Pine Barren Fire Management Plan, 1999	A destructive fire originated in Smithtown and swept through Brookhaven into Riverhead and Southampton. This conflagration was "...perhaps of greater magnitude and more destructive in its effect than any other... These annual fires which usually occur in the spring time, when everything is dry, ... are most frequently originated by fire from passing trains on the railroads, or by intentional act of vicious persons" (Bayles 1873).
Port Jefferson, Rocky Point Preserve	April 1931	Central Pine Barren Fire Management Plan, 1999	An approximately 15,000 acre fire burned from Port Jefferson Station to Rocky Point Preserve. A newspaper article describes fire as starting on Saturday morning, south of Mt. Sinai and south of Port Jefferson Station, burning in a 6 x 4 mile area.
Brookhaven State Park and National Laboratory	1930's	Central Pine Barren Fire Management Plan, 1999	A greater than 4,000-acre fire burned Brookhaven State Park and the northern portion of Brookhaven National Laboratory.
Suffolk Hills County Park	1944	The Nature Conservancy Eastern Heritage Task Force, 1994	Suffolk Hills County Park fire impacting greater than 500 acres
Calverton National Cemetery	1938 to 1947?	The Nature Conservancy Eastern Heritage Task Force, 1994	Calverton National Cemetery fire impacting greater than 1,000 acres
Sears Bellow County Park	July 1964	Central Pine Barren Fire Management Plan, 1999	An approximately 6,000-acre fire burned the Sears Bellows County Park area.
South Yaphank	1960's	Central Pine Barren Fire Management Plan, 1999	A greater than 5,000-acre fire burned in South Yaphank, mostly north of Horse Block Road and south of the LI Expressway.
Peasys	May 25, 1981	The Nature Conservancy Eastern Heritage Task Force, 1994	Peasys – Grassy Pond near Route 25. greater than 500 acres
Manorville Moraine	April 30 and May 1, 1983	The Nature Conservancy Eastern Heritage Task Force, 1994	Manorville Morian, greater than 500 acres
Brookhaven State Park	Oct. 28, 1985	The Nature Conservancy Eastern Heritage Task Force, 1994	Brookhaven State Park, greater than 625 acres
Manorville Moraine	April 20, 1989	The Nature Conservancy Eastern Heritage Task Force, 1994	Manorville Moraine, northwest of Bald Hill, greater than 542 acres
Brookhaven	April 21, 1989	The Nature Conservancy Eastern Heritage Task Force, 1994	Brookhaven, Otis Pike Property, greater than 542 acres
Suffolk County	Aug. 1995	New York State Multi-Hazard Mitigation Plan (September, 2004)	FEMA FSA-2115 (1995) with $5 M eligible damages

Event Location	Date of Main Event(s)	Data Source	General Description
Pine Barrens – Westhampton, Rocky Point, Calverton, and Medford	Aug. – Sept. 1995	West Hampton Fire Department	Aug. 24 – Sept. 5, 1995 – Pine Barren Fires: In August and September 1995, devastating fires raged across Long Island's pine barrens for 13 days. Extreme drought conditions and gusting winds of up to 20 miles per hour (mph) contributed to the ferocity of the blaze. More than 6,800 acres of forest were charred in Westhampton, Rocky Point, Calverton, and Medford, with a state of emergency in effect from August 24 until September 5. Nearly every fire department in Nassau and Suffolk Counties responded, along with several New York City departments and 32 federal, state, and local government agencies. Forty-nine firefighters were injured, none seriously. One house and five fire trucks were destroyed, and nine other houses plus the Westhampton train station were damaged. On October 1, an estimated 32,000 spectators turned out to thank firefighters with a Heroes Parade in Westhampton. August 24, 1995 Fires (part of Pine Barren Fire incident) – "Sunrise Fires" On Aug. 24, 1995, a tanker from the New York National Guard's Air Rescue Group stationed at Gabreski Airport in Westhampton Beach provided assistance to the Westhampton Beach (NY) Fire Department as it battled the epic Sunrise Fire, a monstrous blaze that made international news as it tore through several WUI areas of Long Island. Every volunteer fire department on Long Island as well as paid departments and additional crews from New Jersey, FDNY and Connecticut joined forces to control the wall of flames that leapt over the four-lane Sunrise Highway—and the trucks trying to stop it—and charged toward a housing development. Experts predicted that all of Westhampton Beach could be lost; the flames threatened hundreds of homes and thousands of people, and ultimately burned more than 5,000 acres on both sides of Sunrise Highway. Firefighters brought the fire under control after a week-long battle, but not a single structure was completely destroyed, and there were no fatalities or serious injuries. It became the largest wildfire on Long Island in recent history. Is the all the same "event" – ?
Suffolk County (not specified)	Aug. 1995	NYS DEC http://www.dec.state.Ny.us/website/reg1/smallashes.pdf	The summer of 1995 was Long Island's driest in 71 years. Pine and scrub oak forests in central Suffolk County were tinder dry and ready to explode into flame. On August 21, an 1,800-acre fire, believed to be caused by human activity, started at DEC's Rocky Point Natural Resources Management Area. Three days later, the Sunrise Fire began. With flames from 50-to 200-feet high, it threw burning embers 400 feet across Sunrise Highway, ultimately burning 3,200 acres. By August 27, both fires were extinguished. Firefighters from virtually every fire department on Long Island, along with county, state and federal personnel, responded to the call. In the end, this force of 2,500 strong saved more than 150 structures in the path of the Sunrise Fire. More than 2,500 people responded to the 1995 fires on Long Island, including 2,000 firefighters from 192 fire and ambulance companies all across Long Island, New York City and Connecticut. Thirty-eight DEC forest rangers provided on-ground wildland firefighting expertise and aviation support for helicopter bucket drops. Two hundred members of the U.S. Forest Service's "hotshot" crews and fire management staff came. Pilots from the U.S. Military Academy at West Point and the New York Army National Guard also fought the blaze. Today, you can still see the tree skeletons from the fires of 1995, but the rapidly growing new vegetation is creating healthy and rejuvenated pine barrens. Pitch-pine, scrub-oak barrens are among the most endangered natural communities in the country. They support many uncommon plants and animals, including the globally rare dwarf pitch pine. Land managers, researchers and conservation organizations are working together to restore and maintain these unique areas using methods such as mowing, thinning and prescribed fire.

Event Location	Date of Main Event(s)	Data Source	General Description
Suffolk County (not specified)	Aug. 1995	Gov. Pataki announcement (May 2, 1996) http://www.ny.gov/governor/press/older_years/may2.html	GOVERNOR PATAKI ANNOUNCES AID FOR LONG ISLAND FIREFIGHTERS May 2, 1996 – Governor George E. Pataki today announced the payment of more that $620,000 in Federal Fire Suppression Grants to offset local expenses related to fighting the wildfires on Long Island last August. "All New Yorkers will always take pride and remember their tireless efforts," the Governor said. "I am pleased that FEMA has agreed to ensure that the fire departments and local governments are fully reimbursed for the costs of fighting the wildfire." Suffolk County received $607,779, with Brookhaven and the Village of Westhampton receiving the most. The funding was distributed as follows: Suffolk County: Bayport Fire District, $13,062; Bellport Fire District, $5,900; **Town of Brookhaven, $119,358**; Brookhaven Fire District $8,741; Burns & Roe Services Corp, $7,944; Centereach Fire District, $17,965; and Copiague Fire District, $4,575. Also, East Brentwood Fire District, $11,798; East Moriches Fire District $19,714; East Northport Fire District, $17,517; Flanders Northampton Volunteer Ambulance Volunteer Ambulance, $3,701. Also, Greenlawn Fire District, $8,562; Halesite Fire District, $13,362; Hauppauge Fire District, $10,269; Huntington Fire District, $7,232; Huntington Community Fire Aid Squad, $2,042; Hunting Manor Fire District, $2,825; Jamesport Fire District $5,321; Medford Fire District, $52,522; Middle Island Fire District, $32,230; Montauk Fire District, $5,399; Village of Nissequogue, $8,356; North Sea Fire District $18,955. Also, Sag Harbor Village Fire District, $12,505; Shelter Island Fire Department, $2,100; Sound Beach Fire District, $14,714; Southold Fire District, $7,032; Terryville Fire District, $11,995; Wading River Fire District, $13,097; Village of West Hampton Dunes, $4,474; **Village of Westhampton Beach, $104,683**; West Sayville- Oakdale Fire District, $8,526; Yaphank Fire District $31,303.
Babylon (TWP) – Deer Park Brush Fire	Apr. 20, 2006	Long Island Exchange Joe Wallace (April 22, 2006) http://www.longislandexchange.com/articles/society/suffolkbrushfires042206.html	A blaze which started in Deer Park brought power outages and a suspension of the Long Island Railroad service in some sections. Dry brush, a lack of rain, and low humidity combined to make conditions fire-friendly. As of the date of this draft plan, no estimate has been made regarding damages or acreages burned. Nine hundred Long Island Power Authority customers lost power thanks to the Deer Park blaze.
Babylon (TWP) – Deer Park Brush Fire	Apr. 20, 2006	Newsday.com – Denise Bonilla "Blazes Leave Its Mark On Suffolk" – Apr. 20, 2006.	A brushfire scorched up to 50 acres in western Suffolk County on April 19, wreaking havoc on the roads and rails, knocking out power to homes, and sending a plume of smoke into the air that could be seen for miles. The fire started in Deer Park and spread rapidly into Brentwood, moving in different directions. It took 43 fire companies from Nassau and Suffolk County to battle the blaze, which raged for more than four hours. Traffic was snarled, service on the Long Island Rail Road (LIRR) was interrupted, and hundreds of residents lost power. The cause of the blaze, which broke out about 1:30 p.m. in the Edgewood Oak Brush Plains Preserve (largest remnant of pitch pine scrub oak on Long Island) near the Deer Park LIRR station and the Heartland Industrial Park, is under investigation. Brentwood Fire Chief Bill Winning noted that dry conditions made the area more susceptible to fire. Although officials considered this event as one fire, it had to be fought on three fronts because of high winds that allowed it to spread quickly. Two buildings in the industrial park were evacuated, he said, but no property was damaged by the fires and workers were eventually allowed to return. The Long Island Power Authority (LIPA), at the request of the Deer Park Fire Department, shut off electricity in the area of the fire to protect both emergency workers on the scene and local residents. As a result, about 900 residents temporarily lost power. Two Brentwood firefighters were injured. A number of highways were closed, including the Sagtikos Parkway, Pine Aire Drive, and Long Island Avenue.
Riverhead (TWP) – Pine Barrens in Riverhead and Brookhaven	Aug. 1995	NYS Governor Office of Regulatory Reform http://www.Gorr.state.ny.us/EO16_fulltext.htm	Executive Order No. 16: Declaring a Disaster Emergency in Suffolk County and Contiguous Areas: August 21, 1995 – This declaration was made in response to a fire which incinerated more then 5,000 acres of Suffolk County Pine Barrens situated in the Town of Brookhaven and Riverhead. This fire had resulted in evacuations, injury to response personnel, and economic hardships to affected communities.
Connectquot State Park	Apr. 23, 2007	The Nature Conservancy (Kurtz, 2007)	A wildfire impacted 48 acres on state park land; an area that had been burned several years ago. Several fire companies responded however the departments were able to contain the fire. There were no structural losses.

Note: A summary of reported wildfire events for other participating jurisdictions, including Huntington Twp, Shelter Island Twp, Smithtown Twp, Southold Twp, and Bellport Village in the Town of Brookhaven were not readily available.

Probability of Future Events

It is difficult to predict the likelihood of wildfires in a probabilistic manner, such as "there will be a catastrophic wildfire once every X number of years." This is because a number of variable factors impact the potential for a wildfire to occur and because some conditions (for example, ongoing land use development patterns) exert increasing pressure on the WUI zone. Based on available data, the wildfire hazard will continue to present a risk. Given the numerous factors that can impact wildfire potential, the likelihood of a wildfire event starting and sustaining itself should be gauged by professional fire managers on a daily basis using the methods and tools described above.

Earlier in this section, the identified hazards of concern for Suffolk County were ranked. The NYS Hazard Mitigation Plan conducts a similar ranking process for hazards that affect the State. The probability of occurrence, or likelihood of the event, is one parameter used in this ranking process. Based on historical records and input from the Planning Committee, the probability of occurrence for wildfire events in the County is considered moderate.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. The following text evaluates and estimates the potential impact of the wildfire hazard on SC including:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact, including: (1) impact on life, safety and health of SC residents, (2) general building stock, (3) critical facilities, and (4) economy
- Further data collections that will assist understanding of this hazard over time
- Overall vulnerability conclusion

Overview of Vulnerability

Wildfire hazards can impact significant areas of land, as evidenced by wildfires throughout the United States over the past several years (e.g., New Jersey this past spring experienced a 13,000+ acre wildfire that destroyed homes and closed major roadways). Fire in urban areas has the potential for great damage to infrastructure, loss of life, and strain on lifelines and emergency responders because of the high density of population and structures that can be impacted in these areas. Wildfire, however can spread quickly, become a huge fire complex consisting of thousands of acres, and present greater challenges for allocating resources, defending isolated structures, and coordinating multi-jurisdictional response. If a wildfire occurs at a WUI, it can also cause an urban fire and in this case has the potential for great damage to infrastructure, loss of life, and strain on lifelines and emergency responders because of the high density of population and structures that can be impacted in these areas.

Data and Methodology

Information regarding the wildfire hazard included input and data from the Planning Committee, the Central Pine Barrens Wildfire Task Force, TNC, Brookhaven National Laboratory, FEMA, NOAA's NCDC databases, USGS, USFWS, National Interagency Fire Center, and other sources of documentation for this area.

Impact on Life, Health and Safety, General Building Stock, Critical Facilities and the Economy

As demonstrated by historic wildfire events in SC (e.g., 1995 Sunrise Fires) and other parts of NYS and the country), potential losses include human health and life of residents and responders, structures, and natural resources. In addition, wildfire events can have major economic impacts on a community from the initial loss of structures and the subsequent loss of revenue from destroyed business and decrease in tourism.

For wildfire, the Central Pine Barrens is identified as the largest hazard area of concern. Additionally, The Nature Conservancy has identified several other wildfire hazard areas in SC including Edgewood Oak Brush Plains, Connetquot River, Sayville Grasslands, Conscience Point, Mashomack Preserve and Montauk Peninsula (Figure 5-192). Therefore, all assets in, and adjacent to the WUI zone around these hazard areas of concern, including population, structures, critical facilities, lifelines, and businesses, as described in the County profile section (Section 4), are considered vulnerable to wildfire.

Table 5-59 provides the estimated parcel status by ownership and land use for the Core Preservation Area in the Central Pine Barrens. The areas and resources identified here are considered vulnerable to the damages from wildfire.

Table 5-59. Central Pine Barrens Core Preservation Area – Estimated Parcel Status by Ownership and Land Use in Acres, 2004

Ownership / Land Use	Town of Brookhaven	Town of Riverhead	Town of Southampton	Total
Protected Lands				
Suffolk County	6,401	1,912	11,738	20,050
New York State	8,886	1,119	3,475	13,479
Unites States	2,528	0	182	2,710
Town	946	60	730	1,736
Nature Conservancy	0	58	178	236
Misc. Private	27	0	178	205
Pine Barrens Comm. Easement	371	37	73	480
Sub Total	**19,159**	**3,185**	**16,554**	**38,898**
Developed Lands by Land Use Code				
Residential (200)	798	176	378	1,352
Commercial (400)	193	23	123	338
Entertainment (500)	172	522	284	978
Commercial Services (600)	5,279	0	416	5,694

Ownership / Land Use	Town of Brookhaven	Town of Riverhead	Town of Southampton	Total
Industrial (700)	0	21	100	121
Private Club (900)	77	73	0	149
Sub Total	**6,518**	**814**	**1,301**	**8,632**
Utilities / Transportation (800) Combined Total (Rail, Airport, Phone, Water Authority, etc)	**150**	**617**	**305**	**1,072**
Agricultural (100)	**336**	**57**	**140**	**533**
Other Ownership Categories including Grandfathered Parcels, Hardship Exemptions, Roadfront Exemptions, Private, Vacant, Unprotected and Otherwise Not Categorized Above	**1,426**	**536**	**2,542**	**4,503**
Total	**27,589**	**5,208**	**20,842**	**53,638**

Source: (Central Pine Barrens, 2007).
Notes: Land use codes are from the Property Type Classification and Ownership Codes produced by the State Board of Equalization and Assessment (Albany, NY, 1990; now known as the Office of Real Property Services). Actual built roadways are not included in the above data, as they are not assigned tax map parcel numbers or acreages. It is estimated that there may be approximately 3,000 acres of such roads in the core area.

For the purposes of this Plan, all structures in the WUI zone are at some risk of being destroyed or seriously damaged by a wildfire; however, strong fire suppression, management, and response planning systems are in place.

Due to insufficient data, a full quantitative loss estimate was not completed for the wildfire hazard.

The Central Pine Barrens Wildfire Task Force indicates that wildfires damage hundreds, sometimes thousands, of acres in the Pine Barrens each year. These fires jeopardize homes and businesses in the wildland-urban interface. These fires cost thousands of taxpayer dollars to suppress and control and involve hundreds of operating hours on fire apparatus and thousands of volunteer man hours from the volunteer firefighters. There are also many direct and indirect costs to local businesses that excuse volunteers from work to fight these fires. These fires often cause injury to both civilians and firefighters and may cause damage to structures as well (Central Pine Barrens, 2007).

It is recognized that a number of critical facilities, transportation and utility assets are located in the Central Pine Barrens, and may be vulnerable to the threat of wildfire. Of particular note, the Long Island Expressway and the Long Island Railroad are two major east-west transportation arteries that were closed during the 1995 wildfires.

Additional Data and Next Steps

Data regarding the construction of structures in the study area, such as primary building materials used (e.g., wood versus brick, fire detection equipment, age, etc.), proximity to fast burning/high intensity vegetative communities (for example, Pitch Pine, Scrub Oak), and availability of fire suppression infrastructure should be identified for further evaluation. Several entities with ongoing wildfire management responsibilities in Suffolk County should be involved with any future data collection and analysis. These include the Central Pine Barrens Wildfire Task Force, The Nature Conservancy,

Brookhaven National Laboratory, the 17 local fire jurisdictions through the Suffolk County Fire Chief's Council and Fire District Managers' Association, Suffolk County Office of Emergency Management and Fire Rescue & Emergency Services, New York State Department of Environmental Conservation Wildfire & Incident Management Academy, and NYSEMO. Development and availability of such data would permit a more detailed estimate of potential vulnerabilities, including loss of life and economic damages, based on the population and resources exposed to the hazard.

WUI planning should include ongoing efforts to:

- Identify and map structures, resources, and property that require protection
- Use satellite imagery to create land cover and vegetation community maps outside of the legal boundary of the Central Pine Barrens
- Create land use regulations that encourage construction of defensible space and shaded fuelbreaks
- Create land use regulations that require firewise construction in the WUI
- Reduce fuel and create shaded fuel-breaks (including a combination of mechanical thinning and prescribed fire)
- Include public education campaigns to spread information to citizens at risk

The FEMA fuel model maps do not provide sufficient information to refine the exposure assessment conducted above or to adequately specify the WUI areas in relation to the built (vulnerable) environment. Such data should be developed over time given the localized threat from the wildfire hazard in the Central Pine Barrens area.

Overall Vulnerability Assessment

Buildings constructed of wood or vinyl siding are generally more likely to be impacted by the fire hazard than buildings constructed with bricks or concrete. While it is not possible to predict when and where a fire will start, the local fire departments are well-equipped and prepared to respond to fires as they arise. Large-scale wildfires with causing wide-spread damage are considered likely to occur in the area at some point in the future due to the nature of the vegetative community, fluctuating climate conditions, and increased pressures on the WUI zone. The status of fire risk in the County will continue to be monitored and ongoing and new mitigation efforts to prevent fires and control them when they arise will continue to be developed. The overall hazard ranking for SC as determined by the Planning Committee for this hazard is low (see Tables 5-6 and 5-7).